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An Evaluation of the Use of Learning Objects as an Instructional Aid in Teaching Adults

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Abstract: The purpose of this study was to investigate the effectiveness of learning objects in the CD-ROM format for the teaching of introductory American Sign Language to adult learners. A controlled experiment was used to evaluate the effectiveness of the use of the learning objects to enhance student learning. Findings suggest that there was no indication that the use of learning objects on a CD-ROM affected students' scores at any level of assessment. Reasons for the learning objects not affecting student outcomes were found in the qualitative comments that the students made in the survey. The reasons included: learners' inexperience in using the technology and the difference between signs being taught in the classroom and on the CD-ROM. Recommendations for the future application of learning objects as instructional aids are presented.

Introduction

The evaluation of *learning objects* as instructional aids for teaching via technology has not been widely addressed in the field of adult education. This study attempted to broaden this area of research by investigating the effectiveness of learning objects in the teaching of an introductory American Sign Language (ASL) course to adult learners in a university setting. Learning objects are small units of educational material in a digital format that can be used flexibly and in a variety of combinations to create lessons and serve as instructional aids, reference tools, or sole delivery methods.

For the introductory ASL course, 351 video-based learning objects (with a native ASL speaker performing individual signs or phrases) were created to meet the design needs of deaf ASL teachers and the learning needs of hearing students studying ASL and the deaf culture. These video-based learning objects were placed on CD-ROM to be used for review and practice of the signs and phrases before the beginning of a unit or prior to a quiz or exam.

Literature Review

The term "learning objects" originated from the object-oriented paradigm of computer science. According to Wiley (2000), the idea behind object-orientation involves components (objects) that can be reused in multiple contexts. For the purpose of our research, learning objects are digital entities accessible on CD-ROM for independent use by learners via a computer at the person's own pace.

Learning objects can be developed in many forms such as text, static graphics, animated graphics, video, and audio. The significance of learning objects as an instructional aid for adult learners lies in their flexibility, facilitation of competency-based learning, accessibility,

durability, interoperability, and reusability. According to Longmire (2000), flexibility (use in multiple contexts); facilitation of competency-based learning; and increased value of content are arguments for creating reusable learning objects. Kaiser (2002) states that learning objects should be activity-sized (large enough to be used as an activity within a lesson or module, or large enough to be a lesson by themselves); accessible (easy to locate and use); durable (retain utility over a long period of time); interoperable (can be used on a variety of platforms or course management systems); and reusable (can be used to create other learning activities within a given content area or other content areas).

In our study, learners had personal autonomy and were free to make individual choices about the use of the learning objects. The learning objects were available for the learners to use in a self-directed manner, a way for them to take a proactive approach to their own learning process. This means that the learners were responsible for planning, implementing, and evaluating their own learning process (Merriam & Caffarella, 1999).

Several models in the literature have described self-directed learning as a process (Brockett & Hiemstra, 1991; Garrison, 1997; Grow, 1991; Hammond & Collins, 1991; Knowles, 1975; Spear, 1988; Tough, 1971). Merriam and Caffarella (1999) grouped these self-directed models into three types: linear, interactive, and instructional. The type of self-directed model that closely relates to our study is the instructional model because it represents a framework that instructors in university settings can use to integrate self-directed methods of learning into their class design. Merriam and Caffarella (1999) suggest, “This way of organizing instruction allows for more learner control and independence” (p. 302).

Grow’s (1991) Staged Self-Directed Learning model is a good example of a teaching method to help learners become more independent in their learning. In this model, the author believes that different students have different abilities to be self-directed, teachers must adapt their methods in response, and self-direction can be taught. The model suggests four different stages (dependent, interested, involved, and self-directed). Within each stage learners advance in order to increase self-direction and teachers can help or hinder that development. However, good teachers match the learners’ stage of self-direction and help them become more independent in their learning.

According to Merriam and Caffarella (1999), “Being self-directed in one’s learning is a natural part of adult life” (p. 293). However, not all adults are ready to embark on self-directed learning experiences in a formal academic setting when given the opportunity. This happens mainly when they are not psychologically prepared to take on self-directed learning. Guglielmino (1978) identifies initiative, independence, and persistence in learning; responsibility for one’s own learning; self-discipline; curiosity; ability to work independently; pleasure for learning; propensity to be goal-oriented; and tendency to view problems as challenges rather than obstacles as psychological qualities involved in readiness for self-directed learning.

Technology tools that serve as instructional aids such as learning objects can help students become more self-directed in their learning. However, this can only work if learners have experience with technology as a learning tool, are self-discipline and independent, take responsibility for their own learning, are able to look at problems with technology as challenges, and value the tool as an aid in their learning process.

Purpose of the Study and Research Question

The purpose of this study was to investigate the effectiveness of learning objects on a CD-ROM format in the teaching of introductory ASL. The research question for this study was: Do video-based learning objects on a CD-ROM format improve student learning outcomes?

Methodology

A controlled experiment was used to evaluate the effectiveness of the video-based learning objects in enhancing learning. Six sections of introductory ASL were divided into two groups, a control group and a treatment group (students using the video-based learning objects on CD-ROM). These sections were taught by three teachers, each of whom taught two sections. Each teacher taught one control section and one treatment (video-based learning objects) section. Instruction in both the control and treatment groups was comparable. The control group sections (N = 65) were taught in the same manner that the course had always used based on lectures, in-class examples and drill, and a workbook with a videotape.

The learning objects sections represented the treatment condition for the study. In these sections, the teachers added the use of the video-based learning objects on CD-ROM to the instructional process. Students in these sections were given the CD-ROM containing 351 ASL learning objects, which were short video clips showing a native ASL speaker demonstrating words and phrases relevant to the course, and Windows-based software for displaying the video clips. Teachers in the video-based learning objects sections encouraged the students in those sections to use the learning objects as study aids before each day's class session and to use them to review the in-class material after each class session. However, the students in the learning objects sections were not required to use the learning objects; their use was simply encouraged.

Students in both groups of sections were given the same six quizzes and final exam. The effectiveness of the video-based learning objects was evaluated primarily on the basis of performance in the course. The students' quiz scores, final exam scores, and final course grades were compared using a two-way between-subjects analysis of variance with "treatment" and "teacher" factors. The experimental hypothesis was that the performance of students in the learning objects groups would be better than that in the control groups.

In addition to examining course performance, students in the learning objects groups were given surveys asking their opinion of the usefulness of the learning objects. Also, each teacher and two students were interviewed. Interviewees were videotaped. Teachers were asked how the learning objects were used and about the teaching processes that they had experienced. Students were asked about their previous experience with ASL, how they used the learning objects during the course of the semester, and the benefits and limitations of the learning objects.

Data Analysis and Findings

The following analyses were run on the data: (a) repeated measures on the six quiz scores and final exam score using teacher and treatment group as factors, (b) repeated measures on the six quiz scores using teacher and treatment group as factors (this was done because some teachers allowed students to waive their final exam, thus scoring an automatic 100), and (c) individual ANOVAs on each of the six quizzes as well as the final exam score and final grade (converted to a point score based on the grading procedure of the university). Thirty-four of the

total 65 students in the treatment group admitted to “rarely” or “never” using the learning objects. Thus, repeated measures ANOVA were conducted solely on the students in the treatment group after dividing them into two groups: those who used the learning objects and those who did not. The repeated measures ANOVA were conducted using the learning objects and teacher as factors.

In all analyses, the only factor to be statistically significant was teacher. There was no indication that the use of learning objects affected students’ scores at any level of assessment. Frequencies of each survey question were also run both across teachers as well as for each teacher individually. Means of each quiz score, final exam score, and final grade (in grade points) were calculated within each teacher by treatment group. Furthermore, means were calculated only for the treatment groups (by teacher) based on if they did or did not use the learning objects.

Statistical findings of this study suggest that there was no indication that the use of learning objects affected students’ scores at any level of assessment. Even though there was no indication that the use of the learning objects on CD-ROM affected student learning outcomes as shown in the statistical results, students pointed out in their qualitative comments that the learning objects helped them clarify, remember, review, practice, and reinforce the signs; provided access to signs that were not included in the workbook and videotape; assisted in studying for quizzes and exam; aided with class participation; and helped when absent from class. Two themes emerged from the qualitative data: (1) learners’ inexperience using the technology and inability to problem solve technology issues and (2) difference between teacher’s performance of class signing and the signs performed in the CD-ROM by a native speaker.

Learner’s Inexperience Using the Technology

Learners’ inexperience with using the technology surfaced during the course and it became apparent that some of the students were not able to problem solve technology issues. For example, in some instances students did not check the computer requirements prior to downloading the CD-ROM. When the CD-ROM did not download or their computer crashed they became frustrated and decided not to use the learning objects. In other instances students were not familiar with downloading the required software and rather than asking for assistance made the decision not to use the CD-ROM.

Difference between Teacher’s Performance of Signs and Signs on the CD-ROM

There are various ways of expressing words and phrases in sign language, just as there are in any language. The instructors in the ASL courses used their preferred methods of signing some of the words and phrases. In some instances these were different from the signs on the CD-ROM, which created confusion for the students who were reviewing the signs on the CD-ROM.

Discussion

The evaluation of the effectiveness of learning objects as a component part of instruction with technology creates challenges and opportunities for course design. While the data analysis in our study indicated that learning was not enhanced with the use of the learning objects on CD-ROM, the themes that surfaced in the qualitative comments indicated that the reason was connected to the inexperience of the students in using technology. Based on our study, inexperienced students showed frustration when confronted with new situations involving the

use of technology. They demonstrated the inability to take the initiative to problem solve using the learning objects on CD-ROM. They viewed the technological problem as an obstacle rather than a challenge for their learning experience. We believe that these learners might have had low self-directed learning skills at the time they took the course.

A number of students stated that the learning objects on CD-ROM were helpful; however, the signs were confusing at times because there was a lack of synchronization between what was taught in class and the signs on the CD-ROM. Some of the signs on the CD-ROM were performed differently by the instructor in class. It is not uncommon for this to happen; the same situation might happen in any other language class. Nevertheless, this should have been explained to the students on the first day of class to avoid any confusion. According to Grow's (1991) Staged Self-Directed Learning Model, students who are confused about course content are in Stage 1 of the model, which identifies learners of low self-direction, who need an authority figure to clarify the differences for them.

In this course, lectures, in-class examples and drill, a workbook with a videotape, and the learning objects on the CD-ROM were the instructional methods used to deliver instruction. The CD-ROM was an optional component of the course. We believe that students who appeared to be self-directed chose to use the CD-ROM to assist them in their learning. Because the use of the learning objects on CD-ROM was not a requirement for the course, students with low self-directedness may have made low or no use of the learning objects.

After analyzing survey results, we decided to revise the student survey to include additional demographic information such as student year in school and major. Also, because the use of the learning objects was not a course requirement, we believe that relatively few students in the treatment group used them. Thus, in this case it was not possible to get an accurate assessment of the effectiveness of the learning objects on a CD-ROM format. We repeated the survey at the end of the following semester when the students were required to use the learning objects as an instructional aid. Results of the surveys are being analyzed.

Recommendations

As the use of learning objects as an instructional aid for teaching via technology becomes more prevalent in educational settings, adult educators must be aware of the available tools and their strengths and limitations in the teaching of adults, the technical needs of students, the design of the educational tools in relationship to the course, and the instructions that go along with the materials. From the results of our research we recommend that adult educators receive instruction and be prepared in the use of technology for instruction. The selected technology should be included in the design of the course and tied to course objectives and learning outcomes. In the case of the ASL course, teachers should perform signs that are identical to the ones on the CD-ROM or explain to students the difference among the signs. In addition, a student orientation to the use of technology should be integrated in the beginning of courses to assist students in their self-directed learning process. This orientation should include a demonstration of the use of the learning objects by the instructor and hands-on practice by the students. Furthermore, a pre- and post-test instrument on self-directed learning should be developed and implemented as an integral part of the course. This will allow the instructor to understand the level of student self-directed learning.

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